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LANDSAT Follow - On Investigation Program #21260

Program Progress Report #2

Reporting Period Coverage: December 19, 1975  
March 19, 1976

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Project Principal Investigation

Date submitted:

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NATURAL RESOURCE PROTECTION AND RECREATIONAL  
DEVELOPMENT IN WEST VIRGINIA Progress  
Report, 19 Dec. 1975 - 19 Mar. 1976 (West  
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## I. Problems

No significant problems occurred during the third time period. The only thing that has delayed the progress of the projects has been obtaining the necessary satellite and aircraft imagery.

Additional NASA U-2 color infrared photography flown in 1973 has been ordered and received for use on several of the vegetation cover type projects. This photography will give us most of what we will need.

The only other problem has been the organization of the detailed objectives for the individual target projects. The only two which have not been started are the strip mine inventory and the coal refuse and dam control projects.

## II. Accomplishments and Significant Results

The LANDSAT Program has two main categories for the projects which will be done during this contract.

The first category involves the primary projects which will basically be done by the Earth Satellite Corporation. The satellite imagery will be used more with these, because of the expertise required to interpret the details necessary to make the project's information useful.

The second category has all the projects that the Department of Natural Resources will do or sponsor to be done by graduate students or other agencies. These projects represent the start of the Department's objective to develop a team of remote sensing technicians who will work on "interpretive" projects for the different divisions of the DNR.

### A. Primary Projects

#### 1. A Satellite Image Photomosaic of West Virginia

This project is designed to use 1973 LANDSAT Imagery to construct a color composite photomosaic of West Virginia. The mosaic, which will be made on a 1:500,000 scale, will have the primary ecozones of the state categorized in relation to the vegetation, hydrology, and geological characteristics. The imagery to be used has been chosen but the construction of the mosaic will not start for another 2-3 weeks.

#### 2. The Wetlands Classification Project

This project is in cooperation with the Wildlife Division of the DNR who is doing an

inventory of wetlands in West Virginia. The goal of this LANDSAT Project is to take a county in the Eastern Central Mountainous Section of the State and inventory the wetlands by gathering information that fits into the DNR Classification System. Work has started in the Shinnston area of Harrison County near Fairmont, West Virginia.

The interpretation information will come from satellite imagery of 1:250,000 scale, and 9" X 9" color infrared aerial photography. The information obtained from the CIR photography will be transferred to a 1:24,000 scale overlay.

3. Vegetation Cover Type Project

This project involves the photo interpretation of the "Pocohontas" LANDSAT Frame. The main area of interest is the area south of Clarksburg, West Virginia. The main vegetation types which will be classified are: mixed mesophytic, northern hardwoods, spruce, oak and pine.

The 1:250,000 scale overlays will be made from LANDSAT Imagery taken during the time periods; Mid-Summer (June to September), and Fall (September 20 - October 10).

Although this project has not started yet, it will be completed before August so that the information can be used in a new "Forest Atlas of West Virginia" project which is being done by the West Virginia University Forestry School.

4. The Canaan Valley-Dolly Sods Project

This project has two main objectives which are: (A) To provide ecological information for the naturalist program at Blackwater Falls State Park, and (B) To provide information about a wilderness area near Dolly Sods, which is being considered for purchase as a preserved natural area.

The U-2 CIR Photography at 1:120,000 scale is being used to delineate details for a classification system similar to a USGS System of Level I priorities. The project, which is 75% completed, has involved the use of CIR transparencies and a zoom transfer scope to interpret signatures which are then transferred to a CIR print overlay of 1:24,000 scale.

The satellite imagery will be used to show regional considerations of the area at a scale of 1:250,000, such as ecozones, cities, water bodies, and unique natural features.

5. The Remote Sensing Workshops

These workshops should prove to be very valuable to the "users" and "potential users" of remote sensing imagery.

One of the main goals of the workshops is to provide participants with practical information and applications of some of the different types of remote sensing imagery.

The "practical workshop concept" has received good response from participating agencies. (Enclosed is a preliminary workshop outline).

6. Strip Mine Inventory Project

This project will be done with the coordination of efforts made by the DNR Division of Reclamation to delineate the strip mined areas for an area chosen from the LANDSAT "McDowell" Frame.

The information obtained, which will be displayed on a 1:250,000 LANDSAT overlays, will be similar to the information obtained by a DNR strip mine inspector.

The classification system will include information such as:

- a. Area estimates of the strip mines.
- b. Location of the mines.
- c. A category classification designating:
  - (1) an active mine.
  - (2) a finished and reclaimed mine.
  - (3) an unreclaimed and abandoned mine.

Although the strip mine inventory project has not started yet, it is scheduled to begin sometime in April 1976.

7. Coal Refuse and Dam Control Project

There is a new section of the DNR which has objectives relating to the monitoring and inspection of coal refuse piles, and water impoundment construction.

One of the LANDSAT Projects, which is scheduled to start in the late summer months, will use imagery that comes from the "McDowell" Frame, taken in the spring season of the year to

inventory water impoundments.

The overlay product will be done at a scale of 1:250,000. If added "detail" is necessary to satisfy the usefulness of the project, it will come from high level aerial photography.

**8. An Ecological Interpretation Project**

The U. S. Fish and Wildlife Service has the responsibility of evaluating the natural conditions relating to fish and wildlife habitat in specific areas of West Virginia. These areas are either existing water impoundment areas constructed by the Army Corp. of Engineers, or potential impoundment sites. It is important that the technicians doing the inventories on these areas know how to use remote sensing techniques. The information obtained from these studies can be utilized by several agencies in the State for making Environmental Impact Statements concerning the most effective management of the areas.

A project has been outlined which will utilize CIR high altitude photography and satellite imagery to interpret the natural conditions of one of these areas. The area will involve about 4-6 thousand square acres of land. There are several objectives for this project:

- a. To demonstrate the capabilities of CIR photography and satellite imagery.
- b. To establish a "working system" for the Fish and Wildlife technicians to use for future interpretation projects.
- c. To computerize the data obtained from the study for use by environmentalist from other agencies.

The products from the study will be a CIR photograph overlay map at a scale of 1:24,000 and a satellite enhancement at 1:250,000 scale.

**B. Secondary Projects**

**1. Blackwater Falls State Park**

This project involves the use of color photography, color infrared aerial photography, and satellite imagery to inventory a defined region including Blackwater Falls State Park.

After the initial interpretation project has been done, and an overlay map at the scale of 1:24,000 has been made, an interpretive

program will be organized to present information to the visitors of the park about the "regional ecology" of the park.

These educational concepts and project results will be presented to a group of park supervisors and park naturalists in a meeting held in May 1976.

Babcock and Watoga State Parks will do similar interpretive projects during the summer of 1976.

2. Cooperation with the Washington Nature Conservancy Project

The Nature Conservancy Project is inventorying unique ecological area in West Virginia. The results from this study will be organized into a computerized resources data base.

The classification system that the Conservancy is using has been reviewed and considered for use with the LANDSAT Program results. Modifications will have to be made, but the LANDSAT resources data will be computerized so that agencies in the State will be able to use it more effectively.

3. The Department of Natural Resources is currently doing overlay maps on satellite color composite images at 1:500,000 scale of the Eastern Central Mountainous Section of the State. These overlays will contain information such as: county boundaries, major cities, major water bodies, unique natural areas, and vegetation cover type zones.

4. Public Relations Projects

a. Articles have been put in 14 newspapers throughout the State announcing the establishment of the LANDSAT Program.

b. An article is currently being written for the "Wonderful West Virginia Magazine" concerning the LANDSAT Program and the use of color infrared aerial photography. (Pictures will be included.)

c. Letters have been sent to approximately fifty individuals from different agencies in the State, emphasizing the availability of a

representative from the Department of Natural Resources to give presentations explaining the West Virginia LANDSAT Program.

5. Slide Programs

The Department of Natural Resources is currently organizing two slide-video cassette tape programs which will be available in the Department of Natural Resources Library for use by DNR personnel and other State agencies.

a. Infrared Photography (20-30 minutes - 50% completed)

This slide program will explain the principles, techniques, and applications of infrared photography. The program should be completed by May 10, 1976.

b. The West Virginia LANDSAT Program

This presentation will explain the objectives of the West Virginia Program and give basic information on some of the work being done in other areas of the country. (20-30 minutes - 40% completed)

6. Color Infrared High Altitude Photography Coverage of the State

CIR imagery taken in December, 1973 has been ordered for the DNR. This imagery, which will be available to other agencies, will provide coverage for the entire State on 1:120,000 scale. Also a technician will be available to demonstrate how the photography can be used.

7. Potential Secondary Projects

a. An Inventory of Cooper's Rock State Forest  
Enclosed is an outline concerning this project.

b. A Turkey Habitat Study

The Wildlife Division of the DNR is currently involved with a research project using telemetry methods to monitor the activities of wild turkeys in Pocohontas County, West Virginia.

The LANDSAT Program hopes to use CIR photography to determine the natural conditions of the areas inhabited by the turkeys. This information will give the biologist a better idea of the natural environment of West Virginia's most challenging game bird.

c. Using Aerial Photography and Satellite Imagery for Displays of Information Presented by the West Virginia Department of Commerce  
The DNR is currently organizing a proposal to be presented to the Commerce Department for utilizing imagery for displaying important information in travel brochures, state park directories, and on outline maps.

### III. Publications

No publications have been made at this time.

### IV. Recommendations

No program recommendations can be made at this time.

### V. Funds Expended

The financial report for this period extends from June 19, 1975, to March 11, 1976. Since the program has not started two of the primary projects, the expenditures have been conservative.

#### A. Expenditures made from June 19, 1975 to December 19, 1975.

Value of Contract Funds	Value of Funds Expended	Value of Remaining Funds
\$76,272.00	\$3,222.92	\$73,049.08

#### B. Expenditures made from December 19, 1975 to March 19, 1976.

Value of Contract Funds	Value of Funds Expended	Value of Remaining Funds
\$76,272.00	\$2,869.28	\$70,179.80

#### C. Total Expenditures - \$6,092.20

### VI. Data Use

Value of Data Allowed	Value of Data Ordered	Value of Data Received
\$3,100.00	\$84.00	\$1,170.00

**VII. Aircraft Data**

<b>Value of Data Allowed</b>	<b>Value of Data Ordered</b>	<b>Value of Data Received</b>
<b>\$9,876.00</b>	<b>-0-</b>	<b>\$7,668.00</b>